

Sociosexual Attitudes, Sociosexual Behaviors, and Alcohol Use

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ABSTRACT. Objective: Prior studies have demonstrated an association between high-risk sexual behavior and alcohol use, and there is emerging evidence that dating status and sexual behavior are related to risk for subsequent alcohol use. However, relatively little is known regarding the specific attitudinal or behavioral indicators of alcohol-related risk associated with sexual behavior. The present study distinguished between sociosexual attitudes and sociosexual behaviors, two aspects of sexual risk that may contribute to individual differences in drinking behavior. The primary hypothesis was that sociosexual attitudes would indirectly contribute to heavier drinking through greater engagement in sociosexual behaviors. **Method:** Study hypotheses were tested using baseline data from an alcohol challenge study in a sample of young adult heavy drinkers ($n = 211$, 73.7% male). Participants completed surveys assessing typical drinking behavior and both sociosexual attitudes and

sociosexual behaviors. **Results:** As hypothesized, sociosexual attitudes were indirectly related to heavier alcohol use through greater engagement in sociosexual behavior. However, the relation between sociosexual attitudes and sociosexual behaviors was stronger for men, as were the indirect effects of sociosexual attitudes on drinking behavior. **Conclusions:** Engagement in sociosexual behavior appears to be a risk factor for heavy alcohol use. This highlights the potential utility of targeted alcohol interventions in settings associated with sexual risk, including sexually transmitted infection clinics and college campuses. Future research should explore the mechanisms through which sociosexual behaviors contribute to drinking outcomes to further inform targeted alcohol interventions and to bolster protective factors among those who engage in sociosexual behaviors. (*J. Stud. Alcohol Drugs*, 77, 629–637, 2016)

EMERGING ADULTHOOD (AGES 18–25) is a crucial developmental period predominantly characterized by identity exploration and engagement in high-risk behaviors, including sexual exploration and alcohol consumption (Arnett, 2000). Increases in alcohol use, particularly during the transition to college, are often seen as a normative rite of passage among emerging adults. However, heavy drinking is a major public health concern among college students (Arnett, 2000; Durkin et al., 2005). More than 80% of college students drink alcohol, and 44% of students are classified as heavy episodic drinkers (defined as five or more drinks for men, four or more for women, in one sitting) (Hingson et al., 2005; Wechsler et al., 1995, 2002). Heavy drinking in emerging adulthood is associated with a variety of adverse consequences including driving under the influence, risky sexual behavior, and unintentional injuries (Hingson et al., 2005).

Sexual exploration and engagement in risky sexual behaviors also increase during emerging adulthood. Sexual behavior outside the traditional committed romantic pairing is increasingly typical and viewed as socially acceptable by

emerging adults (Garcia et al., 2012). These types of sexual experiences outside of committed relationships are often referred to as “hookups” (Garcia et al., 2012). In one study, 81% of undergraduate participants reported engaging in hookups, with 34% engaging in sexual intercourse (Reiber & Garcia, 2010). Although casual sex and other varieties of hookups may be viewed as culturally normative in emerging adulthood, they come with a host of negative consequences including sexual assaults, unintended pregnancies, and sexually transmitted infections (Chesson et al., 2003; Corbin & Fromme, 2002; Garcia et al., 2012; Perkins, 2002; Vasilenko et al., 2012). Given that emerging adulthood is characterized by increased involvement in romantic and sexual relationships as well as heavier drinking, it is not surprising that these risk behaviors are significantly correlated at the global level (for a review, see Cooper, 2006; for a meta-analytic review, see Claxton et al., 2015). Furthermore, many studies examining relations between alcohol use and sexual risk have focused on the acute effects of alcohol on sexual decision making and behavior. Results of these studies have been equivocal, and those with positive results have found

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relatively small effects (Cooper, 2006; Caldeira et al., 2009; Kiene et al., 2009; Patrick & Maggs, 2009; Schroder et al., 2009; Vélez-Blasini, 2008).

The literature examining romantic and sexual relationships as predictors of drinking behavior is much more limited. However, the few extant studies support the notion that relationship status is related to drinking behavior. For example, a cross-sectional study of daily drinking in college students who were either single, dating, or in a committed relationship demonstrated that students who were dating drank significantly more than those who were either single or in a relationship (Pedersen et al., 2009). Longitudinal studies on the influence of relationship status on emerging adults' drinking behavior have found similar results. Controlling for high school dating and drinking behavior, dating relationships (comprising committed relationships) were prospectively associated with lighter drinking compared with single status (Fleming et al., 2010). Another recent study examining comprehensive neuropsychosocial profiles of risk found that early involvement in romantic and sexual relationships (age 14) was associated with increased risk for heavy episodic drinking at age 16 (Whelan et al., 2014).

Similarly, there are several studies demonstrating a longitudinal relation between sexual behaviors and later drinking behavior. For instance, early onset of sexual intercourse is associated with subsequent substance use, as well as the development of substance use disorders, among adolescents (Cornelius et al., 2007; Stueve & O'Donnell, 2005). Gender differences in these effects have also been demonstrated. For example, among women, Windle and colleagues (2005) found that more frequent sexual behavior was prospectively associated with heavier drinking trajectories from adolescence to young adulthood. Similarly, O'Hara and Cooper (2015) found that adolescent sexual risk-taking behavior was positively associated with subsequent drinking behavior among females only. It is important to note that some longitudinal studies have failed to find associations between certain indicators of sexual behavior, such as number of sexual partners in the last 12 months, and subsequent alcohol use (Dogan et al., 2010). Thus, associations may be sensitive to the particular sexual behaviors that are assessed.

Although there is emerging evidence for associations between relationship status/sexual behavior and drinking outcomes, the mechanisms of these effects are not clear, as there is no particular reason to believe that engagement in high-risk sex would directly cause someone to drink more heavily. Rather, it seems likely that engagement in high-risk sex is a marker for other processes that more directly contribute to heavy drinking. For example, individuals who are engaged in the "hookup culture" may have greater exposure to high-risk drinking situations (e.g., bars, parties) in which they are likely to seek out potential sexual partners. These individuals may also engage in more frequent alcohol use to meet potential sexual partners or to facilitate casual

sex/hooking up (Dermen et al., 1998; Vander Ven & Beck, 2009). In addition, these individuals may believe that drinking will reduce their own or their potential partners' sexual inhibitions or enhance the quality of the sexual experience (Dermen & Cooper, 1994). Thus, studies examining potential attitudinal and behavioral mechanisms of risk are crucial in understanding the link between sexual risk and drinking behavior.

Personality traits such as sensation seeking and impulsivity may help explain associations between sexual risk and drinking behavior, as they have been identified as important contributing factors to relationship status and sexual activity outcomes as well as alcohol consumption (e.g., Donohew et al., 2000; Hittner & Swickert, 2006; Justus et al., 2000; Kraft & Rise, 1994; Seal & Agostinelli, 1994). Another distinct, but related, individual difference variable of particular interest is sociosexuality. Sociosexuality refers to a person's orientation toward uncommitted sexual relationships (Simpson & Gangestad, 1991). Individuals who score high on sociosexuality are "unrestricted," meaning they have a high interest in casual sex, in contrast to those who are "restricted" (Simpson & Gangestad, 1991). Consistent with the nature of the construct, higher levels of sociosexuality are associated with more frequent sexual behavior. For example, in a study of adults ages 18–54, less restricted sociosexual orientation was associated with more frequent engagement in sexual intercourse, regardless of whether participants were currently in a relationship (Ostovich & Sabini, 2004). Importantly, sociosexuality is also associated with higher risk sexual behavior. In a study of the relation between sociosexuality and sexual risk taking, unrestricted participants reported having more sexual partners in the previous 3 years with whom condoms were not used (Simpson & Gangestad, 1994). There is also some evidence that sociosexuality may be relevant for understanding drinking behavior. In a sample of 240 college students (69% female), participants who reported engaging in intercourse with a casual sexual partner reported higher levels of sociosexuality and heavier drinking relative to participants who were sexually active but did not report intercourse with a casual partner (Vélez-Blasini, 2008).

Historically, sociosexuality has been conceptualized as a unidimensional construct (e.g., Simpson & Gangestad, 1991). However, more recent models highlight the conceptual and predictive utility of distinguishing attitudinal and behavioral aspects of sociosexuality, where *sociosexual attitudes* refers to valenced views about impersonal sex, and *sociosexual behavior* refers to overt or covert engagement in uncommitted sexual activity (e.g., Penke & Asendorpf, 2008; Webster & Bryan, 2007). Two groups of investigators now have used confirmatory factor analytic methods to document that sociosexuality is better described by multifactor models containing separate attitudinal and behavioral components (e.g., Penke & Asendorpf, 2008; Webster & Bryan, 2007).

This is not surprising, as it is easy to imagine that sociosexual attitudes and behavior might differentially predict a host of sexually related phenomena. For example, sociosexual attitudes and behaviors have been reported to differentially predict hostility, narcissism, gender, flirting behavior, and future relationship status (Penke & Asendorpf, 2008).

Overall, sociosexuality seems particularly relevant as an individual difference variable associated with relationship status/sexual activity, and potentially with drinking behavior. However, we are not aware of any studies that have directly examined sociosexuality as a predictor of alcohol use, even though a consistent association has been demonstrated between sociosexuality and relationship status/sexual activity, and relationship and sexual activity status are prospectively associated with alcohol use. Thus, the current work evaluates whether sociosexual attitudes contribute indirectly to drinking behavior via sociosexual behavior. Well-established correlates of sexual behavior and drinking behavior, such as impulsivity and sensation seeking, were also considered when investigating this mediation hypothesis.

In addition to the proposed indirect effects of sociosexual attitudes on drinking behavior through sociosexual behaviors, we examined potential moderation by gender based on the results of prior studies. For example, Webster and Bryan (2007) found a stronger correlation between sociosexual attitudes and behavior among women relative to men. The authors suggested that “from an evolutionary perspective, this gender difference stands to reason, since the number of partners that men want to have often disproportionately outweighs the number of partners they can actually obtain” (Webster & Bryan, p. 920, in reference to Buss & Schmitt, 1993). Findings from Penke and Asendorpf (2008) similarly found greater correspondence between sociosexual attitudes and behaviors among women, relative to men. Thus, we anticipated that the link between sociosexual attitudes and behaviors, as well as the indirect effects of sociosexual attitudes on drinking behavior, would be stronger for women than for men.

Method

Participants

Participants ($N = 236$) were recruited from two college campuses and their surrounding communities, one located in the Southwest ($n = 132$) and one located in the Northeast ($n = 104$). Participants were recruited through flyers distributed on campus and in the community and through Facebook, Craigslist, and print ads. The resulting sample was 75% male with an average age of 22.75 years ($SD = 2.32$). The majority (75.1%) were college students and currently in a serious dating relationship (57.2%), and the average monthly alcohol consumption was 59.17 standard drinks ($SD = 48.15$). Participants were predominantly White (76.6%), with the

remainder identifying as Asian American (6.8%), African American (1.8%), American Indian/Alaskan Native (0.9%), or another racial group (14.0%).

Measures

Sociosexuality Scale. We used a 20-item measure of sociosexuality that included items assessing both sociosexual attitudes and sociosexual behaviors (Bailey et al., 2000). As the attitudinal and behavioral items were separated in our analyses, we describe each below.

Sociosexual attitudes. Sociosexual attitudes were assessed with 15 items from Bailey et al. (2000): 3 from the Simpson and Gangestad Sociosexual Orientation Inventory (Simpson & Gangestad, 1991) and an additional 12 items that were used in Eysenck's (1976) study of the genetics of sexual behavior. All items were scored on a 5-point Likert-type scale ranging from *strongly agree* to *strongly disagree*. Sample items include the following: *Sometimes sexual feelings overpower me*, *group sex appeals to me*, and *sex without love is ok*. The internal consistency reliability of this 15-item measure in the current study was good ($\alpha = .90$). The mean of the 15 items was used in analyses.

Sociosexual behaviors. Sociosexual behaviors were assessed using the five behavioral items from Bailey et al. (2000). Four of the five items asked for frequency of specific sexual behaviors (e.g., number of lifetime sexual partners, number of partners on one and only one occasion), with the fifth asking about the frequency of fantasies about sex with someone other than one's partner. This item was measured on an 8-point scale from 1 (*never*) to 8 (*at least once a day*). Because not all items were on the same scale, they were first standardized before taking the mean of the five items. Internal consistency reliability for the five-item scale was good in the current study ($\alpha = .81$).

Sensation seeking and impulsivity. Sensation seeking and impulsivity were assessed with the Zuckerman–Kuhlman Personality Questionnaire (ZKPQ; Zuckerman et al., 1993). The sensation-seeking subscale of the ZKPQ consists of 11 items. Sample items include *I like doing things just for the thrill of it* and *I sometimes do “crazy” things just for fun*. The impulsivity subscale of the ZKPQ consists of 8 items. Examples include *I often do things on impulse* and *I am an impulsive person*. All items were on dichotomous true/false scales. Internal consistency reliabilities for these measures in the current sample were adequate ($\alpha = .72$ and $.79$, respectively). Sum scores for sensation seeking and impulsivity were used in analyses.

Timeline Followback. Using a calendar, participants were asked to provide retrospective estimates of their daily drinking over the past 30 days starting with their most recent experience. A chart of standard drinks was provided to the participants so they could calculate how much alcohol they had consumed per drinking episode. The Timeline Follow-

back interview has high reliability across multiple populations of drinkers and validity derived from both clinical and general population samples (Sobell & Sobell, 1992). Monthly drinking (the sum of the number of drinks across the 30-day period) was used in analyses.

Procedures

The current study was part of a larger alcohol administration study looking at the effects of alcohol on gambling behavior (video poker play). Eligibility for the study was determined through a telephone screening. Individuals who were between ages 21 and 30 and who reported drinking three or more drinks on at least one day in a typical week during the past 3 months were eligible to participate. Related to the gambling focus of the larger study, participants also had to report playing poker at least once in the past year and had to rank poker among their three most preferred forms of gambling. Participants who reported adverse reactions to alcohol, current/past enrollment in abstinence-based alcohol or gambling treatment, pregnancy, significant health problems, or current use of psychotropic medications were excluded from participation.

Qualifying participants were scheduled to attend two sessions—a beverage administration session in a simulated bar laboratory and a follow-up session. Participants were randomly assigned to receive either placebo or alcohol (target breath alcohol concentration of .08%). Details of the procedures for the alcohol administration session are outlined elsewhere (Morean et al., 2012, 2013). At the end of session 1, participants were scheduled for the 2-week follow-up session during which they completed self-report measures and an interview of their drinking behavior over the month before the beverage administration session. All measures used in the analyses were from the follow-up interview and survey data.

Data analytic plan

We first examined the distributions of variables to determine if they met the assumptions of normality and transformed variables as necessary. Next, a series of regression analyses was conducted in IBM SPSS Statistics for Windows, Version 22.0 (IBM Corp., Armonk, NY), to examine sociosexual attitudes and sociosexual behaviors as predictors of typical drinking behavior and sociosexual behaviors as a mediator of the relation between sociosexual attitudes and drinking behavior. In the first model, sociosexual attitudes were examined as a predictor of typical drinking, controlling for gender, age, race (White vs. non-White), site (East Coast or West Coast), student status (college or not), relationship status (serious relationship or not), sensation seeking, and impulsivity. Next the same variables were examined as predictors of the proposed mediating variable (sociosexual

behaviors). Finally, sociosexual behaviors were added to the original model to test for mediation of the relation between sociosexual attitudes and alcohol use by sociosexual behaviors. If the prerequisites for testing mediation were met (a significant effect of sociosexual attitudes on sociosexual behaviors and a significant effect of sociosexual behaviors on alcohol use), the significance of indirect effects was assessed using PRODCLIN2 (Fritz & MacKinnon, 2007). PRODCLIN2 accounts for the asymmetric nature of the confidence intervals for indirect effects (MacKinnon, 1995). If the confidence interval generated by PRODCLIN2 does not contain the value of zero, the indirect effect is significant at the specified alpha level (.05 in this case). Note that in modern approaches to testing mediation (e.g., tests of indirect effects), a significant direct effect of the independent variable on the dependent variable is not a prerequisite for examining indirect effects (see Kenny et al., 1998). In addition to testing for indirect effects, if analyses indicated evidence for mediated moderation (gender moderating the influence of sociosexual attitudes on sociosexual behaviors) or moderated mediation (gender moderating the influence of sociosexual behaviors on typical drinking), we planned to use the MODMED Macro developed by Preacher et al. (2007) to test explicitly for these effects.

Results

Preliminary analyses

Of the 236 participants in the study, 4 did not return for the follow-up survey session. Within the sample of 232, summary scores were created for any measure on which participants had at least 90% complete data (e.g., 14 of 15 items for sociosexual attitudes). Given the small number of participants with missing data ($n = 21$), we used list-wise deletion of these cases; 6 were missing data for race, 5 for relationship status, 11 for student status, 11 for sociosexual behaviors, and 2 for sociosexual attitudes. One additional participant was excluded because of an extreme value on one of the sociosexual behavior items. Thus, a total of 211 participants had valid data on all variables. Data for the monthly drinking variable were significantly positively skewed (skewness value = 1.88, $SE = 0.17$) and were therefore log-transformed. Four of the five indicators of sociosexual behaviors (all but the item on frequency of sexual fantasies) were also positively skewed (all skewness values > 2) and were therefore transformed. Descriptive statistics for continuous variables are provided in Table 1.

Primary analyses

The primary analyses were conducted using multiple regression with blockwise entry of main effects and interactions. Unstandardized regression coefficients and standard

TABLE 1. Full moderated mediation regression model with descriptive statistics ($n = 211$)

Predictor	<i>M (SD)</i>	ΔR^2	<i>B</i>	<i>SE</i>	β
Block 1		.163*			
Gender			0.061	0.060	.072
Race/ethnicity			-0.093	0.055	-.106
Student status			0.025	0.063	.030
Data collection site			-0.133	0.050	.177**
Relationship status			-0.019	0.049	-.026
Age	22.63 (2.25)		0.003	0.012	.019
Sensation seeking	6.90 (2.64)		0.018	0.011	.129
Impulsivity	2.76 (2.35)		-0.008	0.012	-.053
Sociosexual attitudes	3.08 (0.77)		-0.002	0.003	-.053
Sociosexual behaviors	-0.02 (0.75)		0.192	0.043	.384**
Block 2		.013			
Sociosexual Attitudes \times Gender			0.012	0.006	.175*
Sociosexual Behaviors \times Gender			-0.037	0.109	-.030

Notes: Race/ethnicity (non-White vs. White); student status (college student vs. nonstudent); data collection site (West Coast vs. East Coast); relationship status (in a serious relationship vs. not). Sociosexual behaviors represents the mean of the five standardized sociosexual behavior items.

* $p < .05$, ** $p < .01$.

errors are provided in the text with both unstandardized and standardized coefficients for the full mediation model presented in Table 1. Examination of indices of multicollinearity identified no major problems in the regression models (variance inflation factors < 2.50 and tolerance values > 0.45).

We first examined sociosexual attitudes as a predictor of monthly drinking, controlling for age, gender, race, student status, site, relationship status, sensation seeking, and impulsivity (Block 1). The Gender \times Sociosexual Attitudes interaction was added in Block 2. The Block 1 predictors accounted for significant variability in monthly drinking, $F(9, 201) = 3.358$, $p = .001$, adjusted $r^2 = .092$. Sensation seeking was the only significant predictor ($\beta = .024$, $SE = .011$, $p = .039$), with higher levels of sensation seeking associated with greater monthly alcohol use, although there was a marginal effect for data collection site ($\beta = -.101$, $SE = .051$, $p = .051$), with a trend toward heavier drinking in the East Coast relative to the West Coast sample. There was also a marginal effect for sociosexual attitudes ($\beta = .005$, $SE = .003$, $p = .068$) such that individuals with stronger sociosexual attitudes reported marginally heavier monthly drinking. The Block 2 variable (Gender \times Sociosexual Attitudes interaction) accounted for additional unique variance, $F(1, 200) = 9.043$, $p = .003$, adjusted R^2 change = .035. The significant interaction ($\beta = .014$, $SE = .005$, $p = .003$) was decomposed by examining simple main effects of sociosexual attitudes separately for men and women. Within the sample of men, stronger sociosexual attitudes were associated with significantly greater monthly alcohol use ($\beta = .010$, $SE = .003$, $p = .002$). In contrast, sociosexual attitudes were inversely but not significantly associated with monthly drinking among women ($\beta = -.004$, $SE = .004$, $p = .350$) (Figure 1).

Next, we examined the same variables as predictors of sociosexual behaviors. The Block 1 variables accounted for significant variability, $F(6, 201) = 19.361$, $p < .001$, adjusted $r^2 = .440$. Data collection site ($\beta = .167$, $SE = .081$, $p = .040$)

and relationship status ($\beta = -.167$, $SE = .080$, $p = .039$) were both significant predictors, with participants from the West Coast sample and those not in a serious relationship reporting greater engagement in sociosexual behaviors. There was also a marginal effect for age, with older participants reporting more sociosexual behaviors ($\beta = .036$, $SE = .020$, $p = .065$). Sociosexual attitudes were by far the most robust predictor ($\beta = .033$, $SE = .004$, $p < .001$), with stronger sociosexual attitudes related to more sociosexual behaviors. The addition of the Gender \times Sociosexual Attitudes interaction in Block 2 accounted for unique variance in sociosexual behaviors, $F(1, 200) = 7.922$, $p = .005$, adjusted $r^2 = .019$. Although stronger sociosexual attitudes were associated with greater engagement in sociosexual behaviors for both men and women, the magnitude of the effect for men ($\beta = .041$, $SE = .005$, $p < .001$) was larger than for women ($\beta = .014$, $SE = .006$, $p = .016$) (Figure 2).

Finally, we extended the first regression analysis by adding sociosexual behaviors as a Block 1 predictor and the Gender \times Sociosexual Behaviors interaction as an additional Block 2 predictor (see Table 1 for all coefficients from this model). Again, the Block 1 variables accounted for significant variance in drinking behavior, $F(10, 200) = 5.301$, $p < .001$, adjusted $r^2 = .170$. Site was the only significant covariate, with participants in the East Coast sample reporting heavier drinking ($\beta = -.133$, $SE = .050$, $p = .008$). Sociosexual behaviors were by far the strongest predictor ($\beta = .192$, $SE = .043$, $p < .001$). The addition of the Block 2 variables (Gender \times Sociosexual Attitudes and Gender \times Sociosexual Behaviors) did not account for additional variance in drinking behavior, $F(2, 198) = 2.646$, $p = .073$, adjusted $r^2 = .013$, although the Gender \times Sociosexual Attitudes interaction remained significant ($\beta = .012$, $SE = .006$, $p = .037$).

Next we tested the significance of the indirect effect of sociosexual attitudes on drinking behavior through sociosexual behaviors for the full sample using the product of

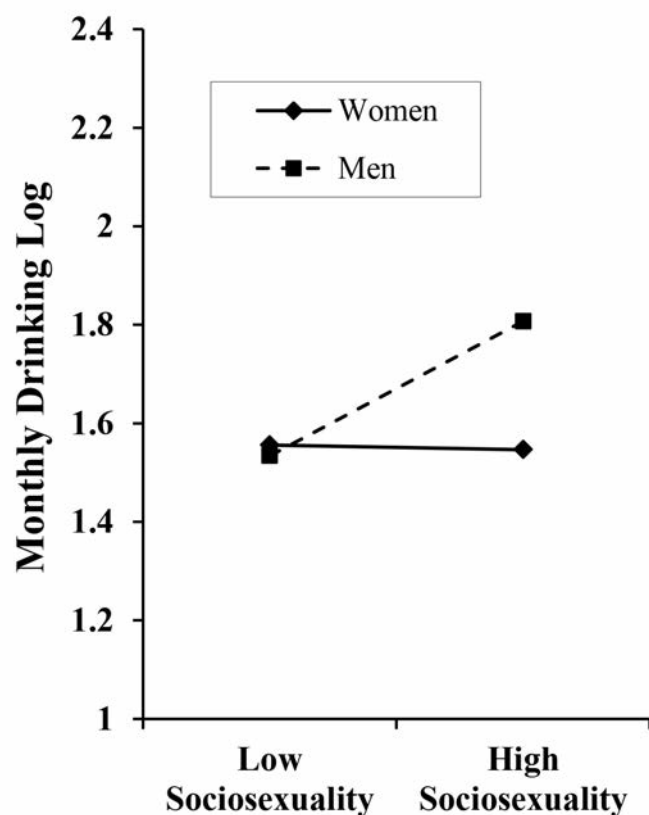


FIGURE 1. Gender \times Sociosexual Attitudes interaction in the prediction of monthly drinking. The outcome reflects log-transformed values for the monthly drinking variable.

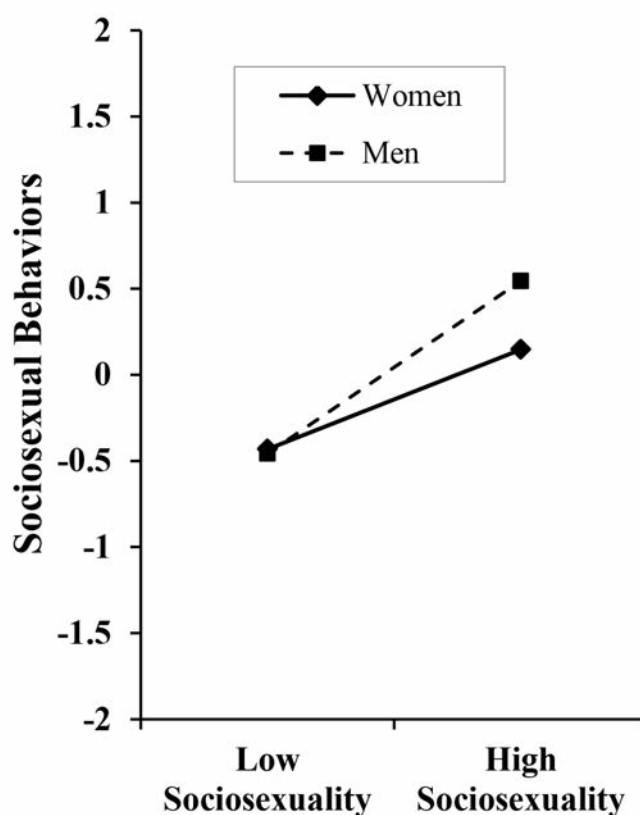


FIGURE 2. Gender \times Sociosexual Attitudes interaction in the prediction of sociosexual behaviors. The outcome is the mean of the five standardized sociosexual behavior items.

coefficients method (MacKinnon, 1995). The resulting confidence interval (CI) did not contain the value of zero (CI: .003, .010), indicating that the indirect effect of sociosexual attitudes on monthly drinking was statistically significant at an alpha level of .05. Given evidence for moderation of the relation between sociosexual attitudes and sociosexual behaviors by gender, we also tested for mediated moderation using the MODMED Macro (Preacher et al., 2007). Our results indicated that the indirect effect of sociosexual attitudes on drinking behavior through sociosexual behavior was significant for both women (CI: .001, .007) and men (CI: .003, .011), although the magnitude of the effect was stronger for men ($z = 3.597$) than for women ($z = 2.371$).

Discussion

Research has demonstrated consistent associations between relationship status/sexual behavior and alcohol use. Although the preponderance of studies have focused on alcohol use as a contributing factor to sexual behavior, evidence for such causal effects has been relatively inconsistent (Cooper, 2006). Moreover, there is emerging evidence to support dating status and sexual behavior as risk factors for later

alcohol use, including heavy episodic drinking (Fleming et al., 2010; Pedersen et al., 2009; Whelan, 2014). The current study sought to distinguish two potentially important aspects of an orientation toward impersonal sex (i.e., sociosexual attitudes and behaviors) that may contribute to individual differences in drinking behavior. We hypothesized that sociosexual attitudes would indirectly contribute to heavier drinking through greater engagement in sociosexual behaviors (e.g., sex with multiple partners). We also expected indirect effects to be stronger for women than for men.

The primary hypothesis of indirect effects of sociosexual attitudes on alcohol use through sociosexual behaviors was supported. Our results showed that stronger sociosexual attitudes (an "unrestricted" orientation) were positively associated with engagement in sociosexual behaviors which, in turn, were related to higher levels of alcohol use. Although indirect effects were present for both men and women, the indirect effect was larger for men. In addition, gender moderated the direct (nonmediated) relation between sociosexual attitudes and drinking. Stronger sociosexual attitudes were directly related to increased alcohol use for men but not for women. These findings were surprising as prior studies have demonstrated stronger links between sociosexual attitudes

and behaviors for women, relative to men (Bailey et al., 2000; Webster & Bryan, 2007). It may be that the current findings relate to the relatively high risk sample of women in the current study (e.g., heavy drinking women who are regular gamblers) relative to prior studies. It is also possible that these contradictory findings were related to the relatively small number of women in our sample. It will be particularly important for future studies of relations among sociosexual attitudes, sociosexual behaviors, and alcohol use to include larger and more representative samples of women given the disproportionate experience of negative sexual consequences of heavy drinking by women (e.g., Testa & Livingston, 2009).

The overall finding of indirect effects for both men and women has several potentially important implications. First, the results suggest that trait risk factors (sociosexual attitudes) may promote engagement in sociosexual behaviors. Thus, individuals with strong sociosexual attitudes may be an important group for targeted sexual risk prevention programs, and these attitudes may be identified even before engagement in sexual behavior. Importantly, the results of this study indicate that engagement in high-risk sexual behavior, such as casual sexual encounters outside of a serious relationship, may also serve as a risk factor for heavy drinking. Although not directly addressed in the current study, sociosexual behaviors may also confer risk for experiencing negative consequences of heavy drinking to the extent that these behaviors are associated with greater co-occurrence of alcohol use and sexual behavior. Future studies are needed to determine if stronger sociosexual attitudes are associated with greater co-occurring alcohol use and sexual activity, as the co-occurrence of these behaviors in event-level studies is associated with increased risk for unprotected sex with new partners (Brown & Venable, 2007; Cooper, 2002; Leigh, 2002). An association between serial casual sex/uncommitted sexual encounters and increased risk for negative consequences of alcohol use would suggest the need for targeted alcohol interventions in settings associated with sexual risk (e.g., sexually transmitted infection clinics and college campuses).

Although the results of this study have potentially important implications, the findings should be viewed in the light of several limitations. A complete understanding of the indirect effects of sociosexual attitudes on alcohol use through sociosexual behaviors is limited in this study by the cross-sectional nature of the data. Concerns about reverse causality are perhaps most problematic with respect to the relation between sociosexual behavior and drinking behavior. Indeed, there is evidence for positive, bi-directional longitudinal associations between sexual risk-taking behavior and alcohol use for men (O'Hara & Cooper, 2015). However, previous experimental studies have found inconsistent support for the association between these two variables in the reverse order than was proposed in the present study (Caldeira et al.,

2009; Cooper, 2006; Patrick & Maggs, 2009; Vélez-Blasini, 2008). In contrast, although studies examining relationship status and sexual activity as predictors of alcohol use have been less common, they have consistently supported this hypothesis (Fleming et al., 2010; Pedersen et al., 2009; Whelan et al., 2014). However, it is important to note that those studies did not measure the construct of sociosexual behaviors explicitly, and this literature is less developed. Thus, it will be important for future studies to use prospective study designs to examine indirect effects of sociosexual attitudes on alcohol use. Although perhaps less obvious, it is also possible that engagement in sociosexual behaviors that are common in the hook-up culture of college contribute to changes in attitudes to bring them in line with behavior. This possibility is certainly consistent with self-perception theory and cognitive dissonance (Bem, 1967; Festinger, 1957).

It is also important to mention limitations of our measurement approach. First, all of our measures were collected at a follow-up session following an alcohol challenge. Thus, it is possible that experiences in the laboratory session may have affected responses on the surveys. Regarding our measurement of sociosexual behaviors, consistent with prior research (e.g., Bailey et al., 2000; Simpson & Gangestad, 1991), we included items on sexual fantasies and projected future partners. These do not really represent current sexual behavior that poses risk for negative outcomes and might even be construed as protective (e.g., engaging in sexual fantasy rather than infidelity). Nonetheless, we believe these items are important in capturing the tendency to engage in unrestricted sexual behaviors, and they have performed well in prior studies. Moreover, although we did not measure important aspects of sexual risk taking, prior studies have established that measures of sociosexual behaviors like the one used in the current study are reliably related to engagement in unprotected sex and risk for sexually transmitted infections (Hall & Pichon, 2014; Seal & Agostinelli, 1994). Regardless, future studies that address sociosexual behaviors, sexual risk behaviors, and alcohol use are needed to understand the potentially complex interplay among these behaviors.

Perhaps the most important limitation of the current study is that the findings do not speak to the mechanisms through which sociosexual behavior contributes to drinking outcomes. This represents an important direction for future research, with many important hypotheses regarding the mechanisms to be explored. For example, it may be that those who engage in more sociosexual behaviors also engage in more frequent alcohol use to meet potential sexual partners or to facilitate casual sex/hooking up (Dermen et al., 1998; Vander Ven & Beck, 2009). Similarly, these individuals may believe that drinking will reduce their own or their potential partners' sexual inhibitions or enhance the quality of the sexual experience (Dermen & Cooper, 1994). Alternatively, individuals who participate in more socio-

sexual behavior may simply have greater exposure to drinking situations and therefore greater opportunity to engage in alcohol use. Understanding the mechanisms through which sociosexual behavior contributes to drinking outcomes is important given the opportunities for targeted alcohol intervention for those who engage in sociosexual behavior.

Despite the above-noted limitations, the current research makes an important contribution to the literature as the first study to examine both direct and indirect effects of sociosexual attitudes on alcohol use. Understanding mechanisms through which trait risk factors confer risk for both alcohol use and sexual risk provides important potential avenues for intervention. For example, the findings of the current study suggest that targeted alcohol interventions might have particular utility in settings associated with high sexual risk (including college campuses). Although men may be a particularly important target for such interventions (both direct and indirect effects of sociosexual attitudes were stronger for men than for women), the disproportionate risk for negative sexual consequences of heavy drinking among women make approaches targeting individuals with strong sociosexual attitudes important for both men and women.

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